FIG. 1

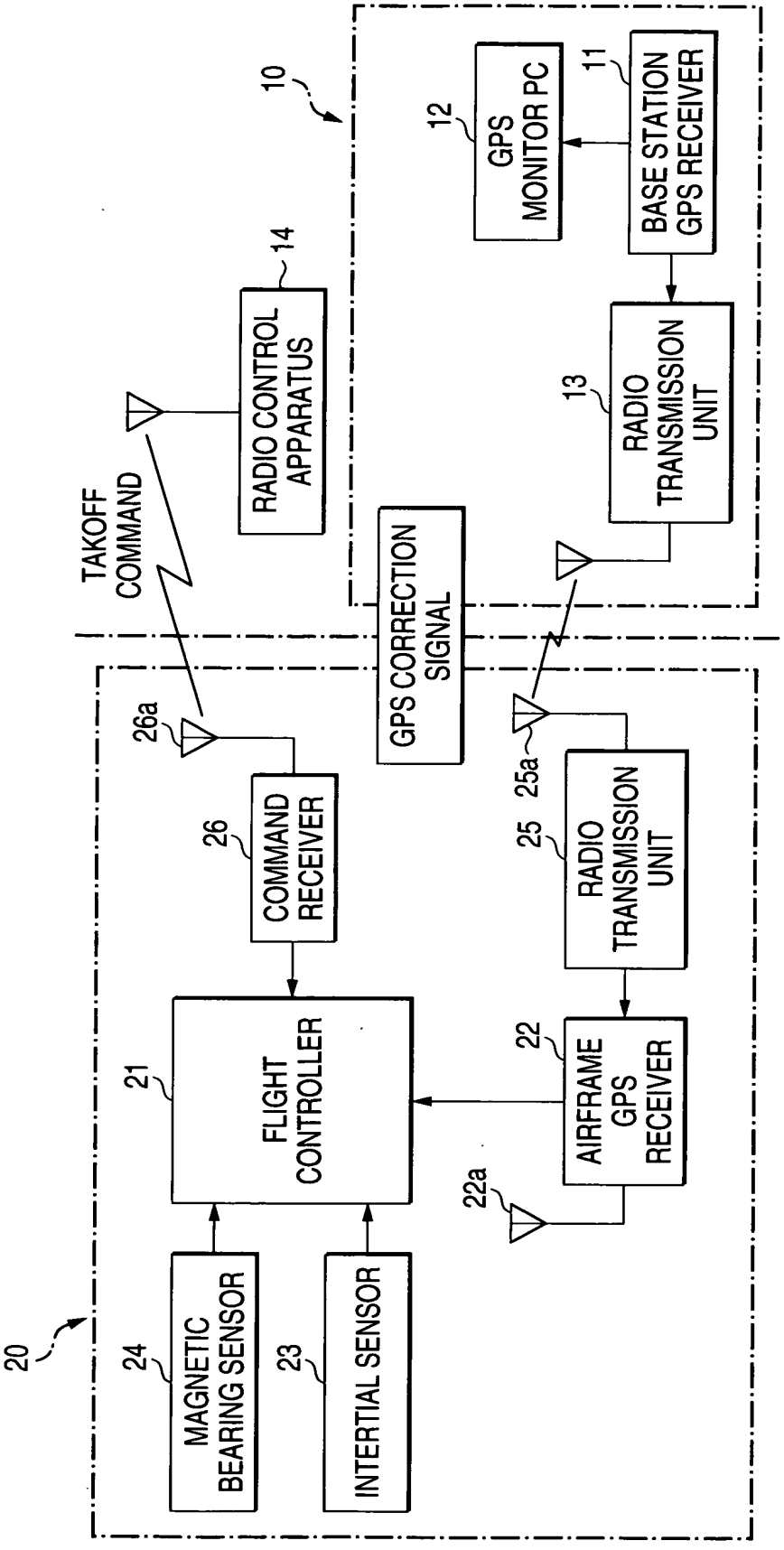
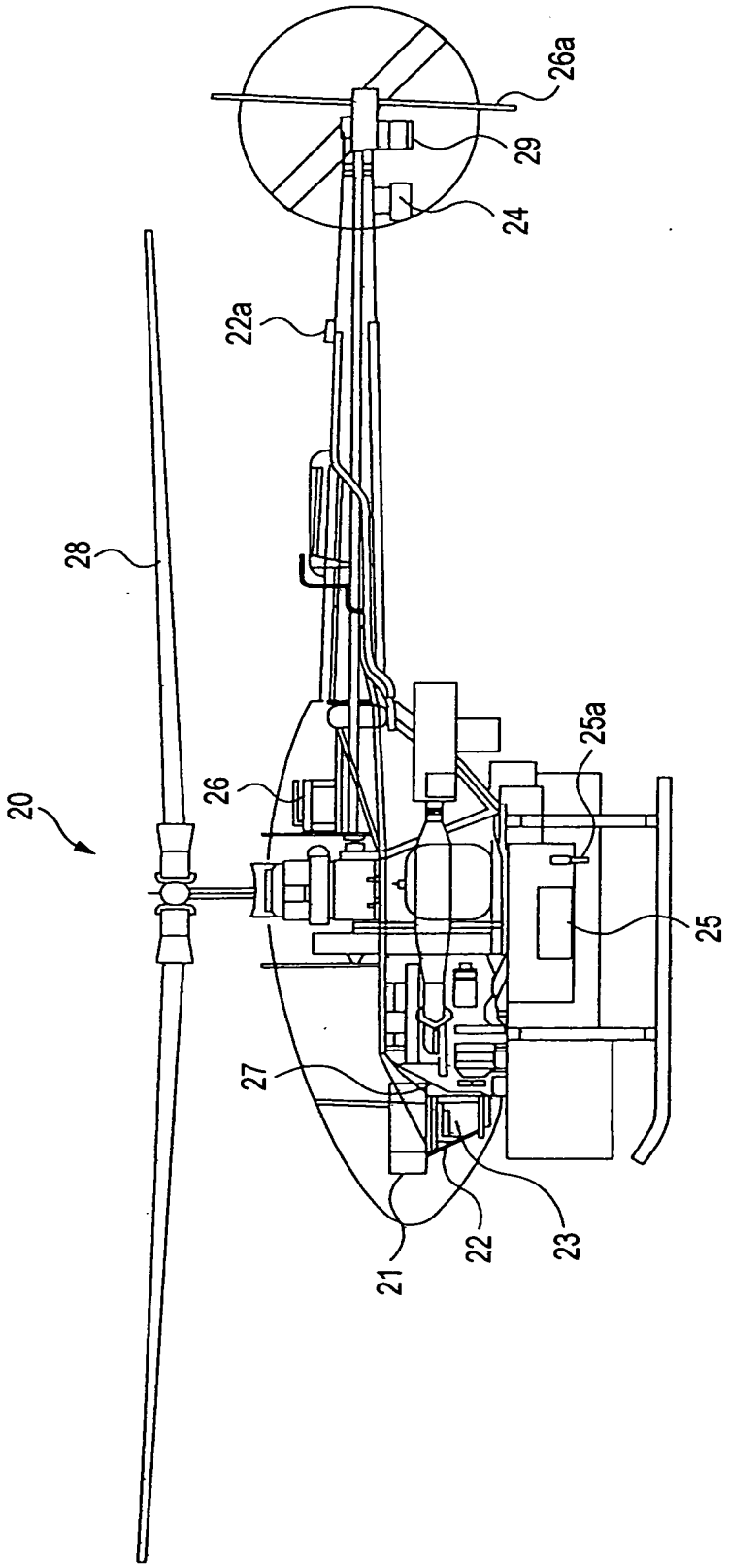

10
12
GPS MONITOR PC
11
BASE STATION GPS RECEIVER
14
RADIO CONTROL APPARATUS
13
RADIO TRANSMISSION UNIT
TAKOFF COMMAND
GPS CORRECTION SIGNAL
26a
25a
26
COMMAND RECEIVER
25
RADIO TRANSMISSION UNIT
21
FLIGHT CONTROLLER
22
AIRFRAME GPS RECEIVER
22a
20
24
MAGNETIC BEARING SENSOR
23
INTERTIAL SENSOR

FIG. 2



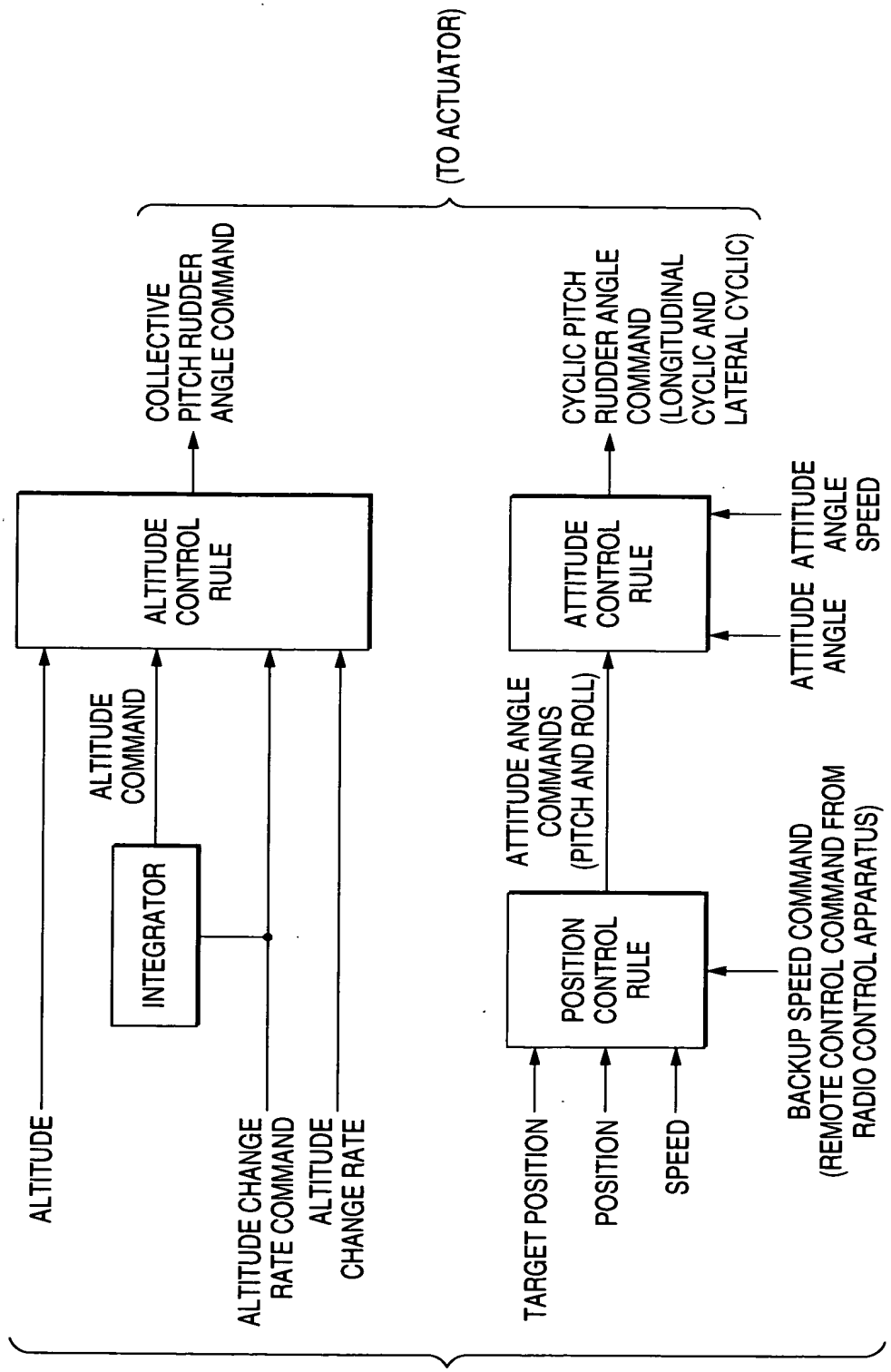

(TO ACTUATOR)
COLLECTIVE PITCH RUDDER ANGLE COMMAND
CYCLIC PITCH RUDDER ANGLE COMMAND (LONGITUDINAL CYCLIC AND LATERAL CYCLIC)
ALTITUDE CONTROL RULE
ATTITUDE CONTROL RULE
ATTITUDE ANGLE
ATTITUDE ANGLE SPEED
ALTITUDE COMMAND
INTEGRATOR
ATTITUDE ANGLE COMMANDS (PITCH AND ROLL)
POSITION CONTROL RULE
ALTITUDE
ALTITUDE CHANGE RATE COMMAND
ALTITUDE CHANGE RATE
TARGET POSITION
POSITION
SPEED
BACKUP SPEED COMMAND (REMOTE CONTROL COMMAND FROM RADIO CONTROL APPARATUS)

FIG. 3

FIG. 4

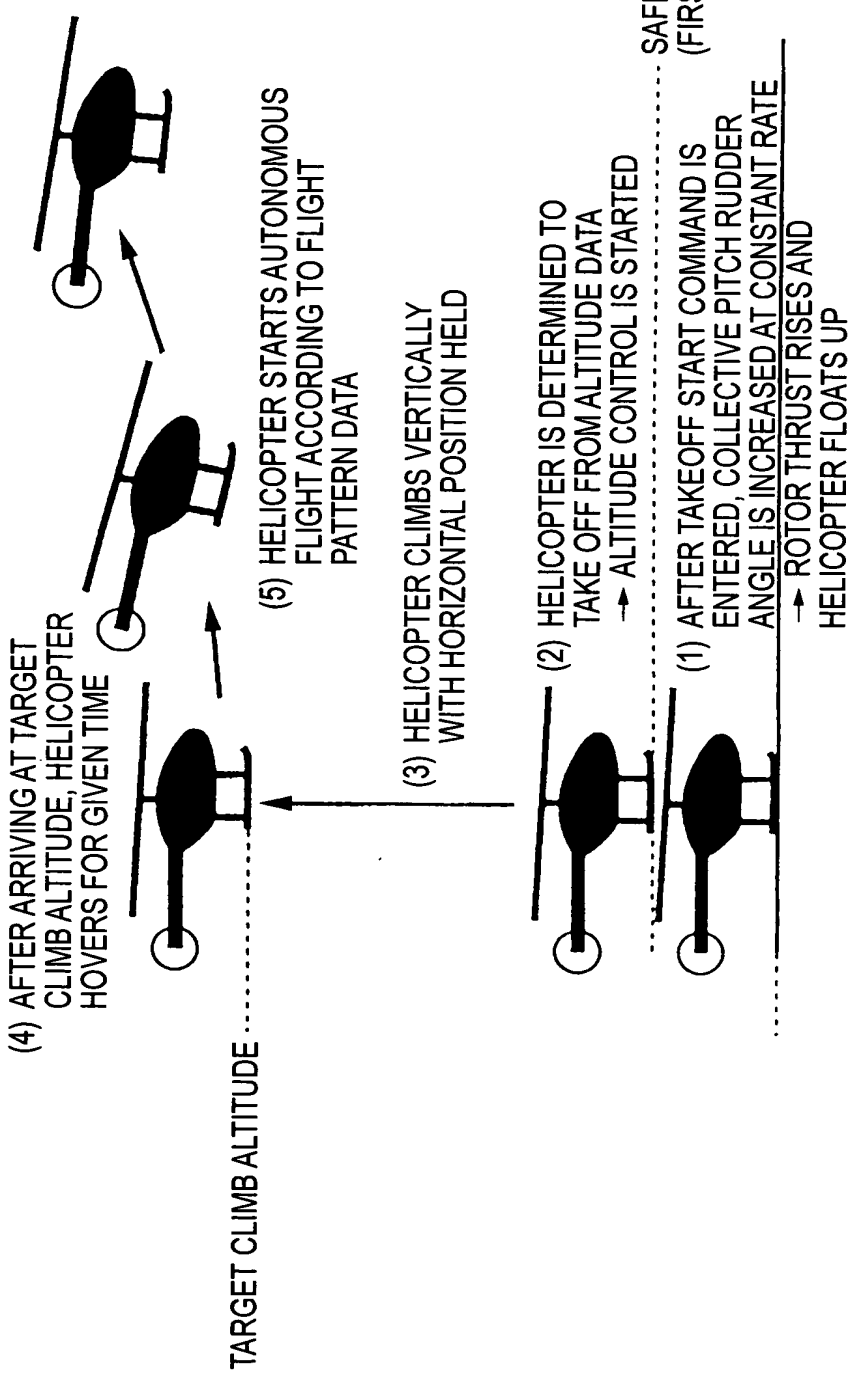
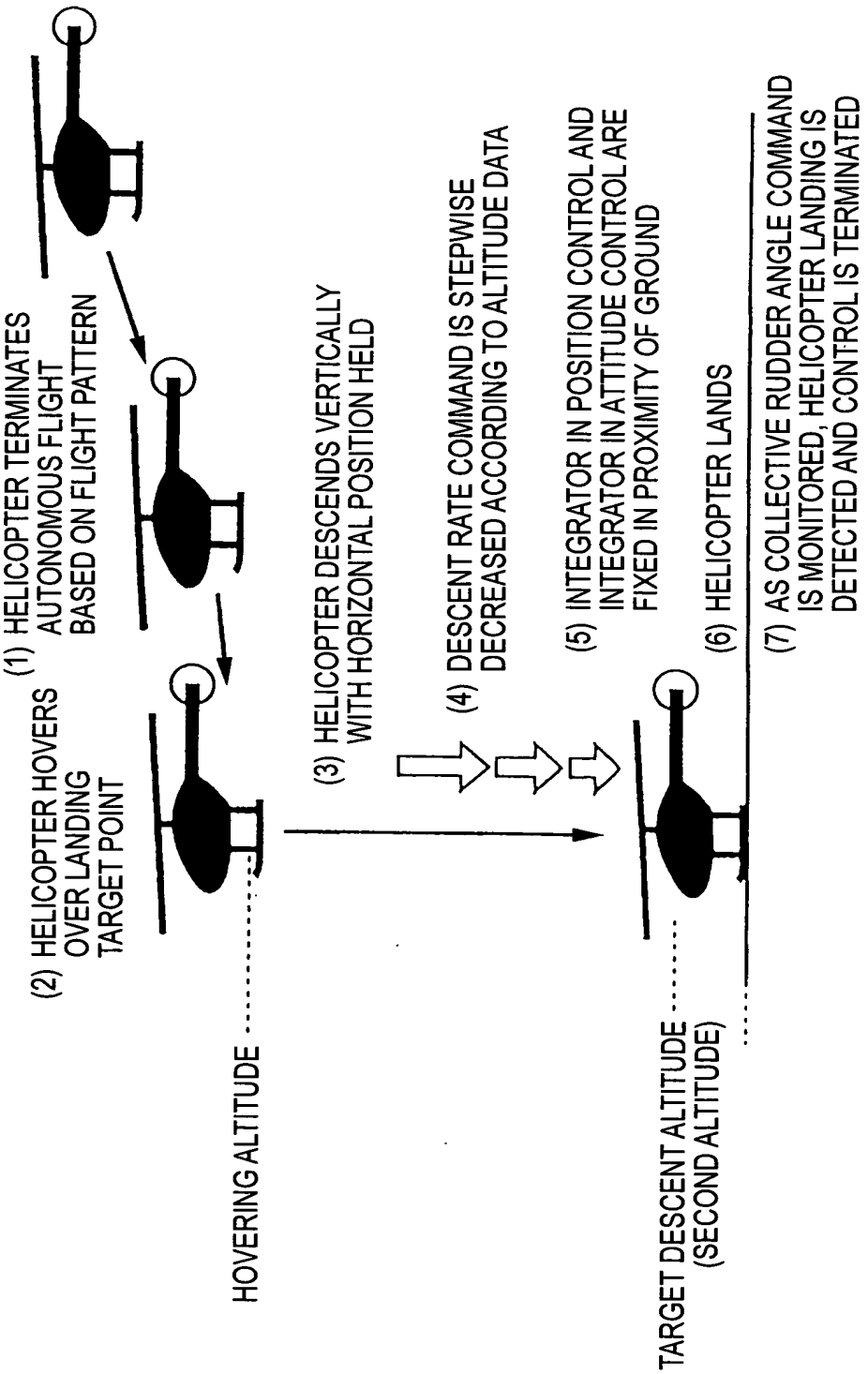

(1) AFTER TAKEOFF START COMMAND IS ENTERED, COLLECTIVE PITCH RUDDER ANGLE IS INCREASED AT CONSTANT RATE
→ ROTOR THRUST RISES AND HELICOPTER FLOATS UP
(2) HELICOPTER IS DETERMINED TO TAKE OFF FROM ALTITUDE DATA
→ ALTITUDE CONTROL IS STARTED
SAFE ALTITUDE (FIRST ALTITUDE)
(3) HELICOPTER CLIMBS VERTICALLY WITH HORIZONTAL POSITION HELD
(4) AFTER ARRIVING AT TARGET CLIMB ALTITUDE, HELICOPTER HOVERS FOR GIVEN TIME
(5) HELICOPTER STARTS AUTONOMOUS FLIGHT ACCORDING TO FLIGHT PATTERN DATA
TARGET CLIMB ALTITUDE

FIG. 5


(1) HELICOPTER TERMINATES AUTONOMOUS FLIGHT BASED ON FLIGHT PATTERN
(2) HELICOPTER HOVERS OVER LANDING TARGET POINT
HOVERING ALTITUDE
(3) HELICOPTER DESCENDS VERTICALLY WITH HORIZONTAL POSITION HELD
(4) DESCENT RATE COMMAND IS STEPWISE DECREASED ACCORDING TO ALTITUDE DATA
(5) INTEGRATOR IN POSITION CONTROL AND INTEGRATOR IN ATTITUDE CONTROL ARE FIXED IN PROXIMITY OF GROUND
(6) HELICOPTER LANDS
(7) AS COLLECTIVE RUDDER ANGLE COMMAND IS MONITORED, HELICOPTER LANDING IS DETECTED AND CONTROL IS TERMINATED
TARGET DESCENT ALTITUDE (SECOND ALTITUDE)